



NASA STTR 2018 Phase I Solicitation

T1.01 Affordable Nano/Micro Launch Propulsion Stages

Lead Center: MSFC

Participating Center(s): AFRC

Technology Area: TA1 Launch Propulsion Systems

NASA is recognizing a growing demand for dedicated, responsive small spacecraft launch systems and seeks to facilitate the establishment of a robust launch service provider market sector. The movement toward small spacecraft missions is largely driven by rising development/launch costs associated with conventional spacecraft, which poses severe threats to future science/commercial mission cadence, and by rapidly evolving miniaturization innovations that are revolutionizing small spacecraft platform capabilities. This topic seeks innovative technologies, subsystems, and efficient streamlined processes that will support the development of affordable small spacecraft launch systems having a 5-180 kg payload delivery capacity to 350 to 700 km at inclinations between 28 to 98.2 degrees to support both CONUS and sun synchronous operations. Affordability objectives are focused on reducing launch costs below \$1.5M/launch for payloads ranging up to 50 kg or below \$30,000/kg for payloads in excess of 50 kg. It is recognized that no single enabling technology is likely to achieve this goal and that a combination of multiple technologies and production practices are likely to be needed. Therefore, it is highly desirable that disparate but complementary technologies formulate and use standardized plug-and-play interfaces to better allow for transition and integration into small spacecraft launch systems.

This subtopic seeks to mature innovative ideas providing a pipeline of components, processes, technologies, propellants, and materials that enhance propulsive performance or that enable adequate propulsive performance at a significant cost savings. Innovations submitted under this subtopic must focus on meeting the affordability objectives. Each innovation must be linked to an existing or proposed launch architecture and operational paradigm. A develop path must be outlined that defines the current development state of the innovation(s) and outlines the improvements sought that will enable a launch system to meet the affordability objectives.

Proposed ideas must lead to a proof of concept test during Phase II. The test results should provide measurements of the propulsive performance required for the proposed launch architecture. Test article costs must be disclosed and linked to the affordability objectives.

The pipeline is meant to feed SBIR topic Z9.01, Small Launch Vehicle Technologies and Demonstrations.

Technology areas of specific interest from Z9.01 are as follow:

- Innovative Propulsion Technologies & Prototype Stages.
- Affordable Guidance, Navigation & Control.
- Manufacturing Innovations for Launch Vehicle Structures & Components.

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- Reusability Innovations.
 - Dual Use Hypersonic Flight Testbeds.Â

Proof of concept testing that mature technologies forÂ inclusion in these areas of interest are specifically sought.